Factors Associated with Low Birthweight in an Inner-City Population: The Role of Financial Problems

DONALD B. BINSACCA, MS, JUDITH ELLIS, PHD, DEBORAH G. MARTIN, MS, AND DIANA B. PETITTI, MD

Abstract: A case-control study of low birthweight among residents of high risk areas of Alameda County was conducted in 1983. The relation of 13 variables to low birthweight was assessed using a multiple logistic regression analysis. A six-fold increase in the risk of low birthweight was found in association with financial problems during the current pregnancy, controlling for differences in race, certain poor health habits, complications of pregnancy, and several other factors between cases and controls. (*Am J Public Health* 1987; 77:505–506.)

Introduction

Despite declines in infant mortality, probably brought about by neonatal intensive care,[1–3] the birthweight distribution has changed little in the past 25 years.[4,5] For this reason, interest in finding effective ways to prevent low birthweight and to identify women at risk of bearing low birthweight infants has increased.

Women who reside in inner cities are known to be at risk of poor perinatal outcome, and urban areas of Alameda County in California are no exception. In 1978, an analysis of infant mortality for the county revealed that infant mortality in inner city areas was almost double that in the county as a whole.[6] Since that time, infant and perinatal mortality differentials have been carefully monitored, and county and other local health care providers have made a concerted effort to reduce mortality in these high risk Health Planning Areas (HPAs). [HPAs are contiguous groups of census tracts that share economic and social characteristics. High-risk HPAs are those with perinatal and/or infant mortality rates 30 per cent or more higher than the county average for three or more consecutive four-year periods.] Nevertheless, the mortality differentials between the high-risk HPAs and the remainder of the county persist, largely because of the higher percentage of low birthweight infants born to mothers residing in high-risk HPAs. Alameda County Health Care Services Agency, therefore, undertook a case-control study of the correlates of low birthweight in this inner-city population to identify potentially modifiable factors associated with low birthweight and variables predictive of risk.

Methods

Cases and controls were selected from a chronological list of 3,978 deliveries at Highland General Hospital (HGH) from 1978 through 1982. Singleton deliveries weighing 500–2500 grams were included as cases (N = 278). [During the study period, 3,978 or 5 per cent of all deliveries in the county occurred at HGH. Of these, 60 per cent of the women resided in high-risk HPAs, and 75 per cent resided in the City of Oakland.] For each case, the next delivery weighing more than 2500 grams was selected as a control (N = 287). Infants with congenital anomalies were excluded. Information was abstracted from medical records, patient logs and rosters, and vital certificates.

Previous research on the correlates of low birthweight[7–16] suggests many variables of interest, but only 14 variables, those considered most complete and of greatest interest, were selected for inclusion in the final analysis (Table 1). The variable "financial problems" was defined as any note in the medical record indicating that the woman had experienced financial difficulties or hardship during pregnancy, such as inability to meet a rent payment or buy food, unemployment of self or partner, loss of medical insurance or difficulty obtaining medical benefits, or insufficient money for bus fare to prenatal appointments or the hospital for delivery.

Multiple logistic regression analysis was used to assess the association of each of these variables with low birthweight.

Results

Crude estimates of relative risk are above 1.0 for most of the variables (Table 1). Particularly striking is the seven-fold increase in risk of low birthweight in women who experienced financial problems during the index pregnancy.

Of the five socioeconomic factors included in the analysis, three were associated independently with an increased risk of low birthweight (Table 2). Of particular note, women who experienced financial problems during their pregnancies had a risk of bearing a low birthweight infant 5.9 times greater than that of other women, controlling for all other variables listed in the Table.

Of the three behavioral variables included here, the risk of low birthweight was nearly tripled in women who smoked. The estimated risk of low birthweight in users of illegal drugs was 1.0, but the confidence limits were wide. Alcohol use during pregnancy was found to have a protective effect against the risk of a low birthweight delivery; data for this variable were poorly recorded, however.

Of the pregnancy-related variables, gravidity was associated with slightly decreased risk of low birthweight, whereas the other five variables were associated with an increased risk of low birthweight.

Discussion

The most important finding from this study is the magnitude of the association of financial problems with low birthweight. This item was not routinely recorded on the medical record. It appeared only if and when a woman had financial problems that she discussed with her clinician at a prenatal visit, and the clinician felt the problem was serious enough to warrant recording in the medical record.

Address reprint requests to Donald B. Binsacca, MS, Director, Management Systems and Analysis, Alameda County Health Care Services Agency, 499 Fifth Street, Oakland, CA 94607. Ms. Martin is also with that agency; Dr. Ellis is with the Office of Health Affairs, Office of President, University of California, Berkeley; Dr. Petitti is with the Division of Family and Community Medicine, School of Medicine, University of California, San Francisco. This paper, submitted to the Journal February 10, 1986, was revised and accepted for publication October 28, 1986.

TABLE 1—Distribution of Cases and Controls by Selected Study Variables and Crude Estimates of Relative Risk of Low Birthweight

Variables	Cases (N = 278) %	Controls (N = 287) %	Relative Risk[a]	95% CL
Sociodemographic				
Black Race	64.4	41.5	2.6	1.8, 3.6
Resident of High-Risk HPA	47.1	28.6	2.2	1.6, 3.1
Refugee	6.8	6.6	1.0	0.5, 2.0
Financial Problems	37.1	7.7	7.1	4.5, 11.2
Not Living with Partner	55.7	41.1	1.8	1.3, 2.5
Behavioral				
Smoker	50.0	23.0	3.3	2.3, 4.8
Alcohol User	6.1	1.7	3.7	1.4, 9.5
Illegal Drug User	13.3	4.2	3.5	1.9, 6.7
Pregnancy Related				
Primigravida[b]	31.4	29.0	1.0	0.9, 1.1
Previous Induced Abortion	24.5	16.0	1.7	1.1, 2.6
Previous Spontaneous Abortion	23.4	16.4	1.4	1.0, 2.0
Previous LBW Infant	20.9	7.0	3.5	2.1, 5.9
No Prenatal Care	18.7	6.6	3.2	1.9, 5.5
Complication of Pregnancy	26.3	9.1	3.6	2.2, 5.7

[a]Estimated by its approximation, the odds ratio.
[b]Only primigravida was used in the univariate analysis.

TABLE 2—Relative Risks of Low Birthweight for Selected Study Variables based on Multiple Logistic Regression

Variables	Relative Risk[a]	95% CL
Sociodemographic		
Black Race	1.7	1.1, 2.8
Resident of High-Risk HPA	1.9	1.3, 3.0
Refugee	2.2	1.0, 5.1
Financial Problems	5.9	3.3, 10.5
Not Living with Partner	1.2	0.8, 1.9
Behavioral		
Smoker	2.8	1.8, 4.5
Alcohol User	0.6	0.3, 1.0
Illegal Drug User	1.0	0.4, 2.4
Pregnancy Related		
Gravidity	0.7	0.6, 0.8
Previous Induced Abortion	2.0	1.1, 3.5
Previous Spontaneous Abortion	2.2	1.2, 3.8
Previous LBW Infant	6.2	3.1, 12.5
No Prenatal Care	3.8	2.0, 7.3
Complication of Pregnancy	2.0	1.4, 3.1

[a]Estimated by its approximation, the odds ratio.

There are some variables, such as use of illicit drugs and alcohol, that are poorly recorded in medical records, and it is possible that more precise classification of subjects according to these or other variables would explain the association of birthweight with financial problems. On the other hand, more precise classification of women with financial problems would tend to make the association with birthweight even larger. Notwithstanding the limitations of the data used in the study, the elevation of the risk of low birthweight in women who experience serious financial problems during pregnancy is impressive, and it is a potentially useful tool in assessing risk.

As such, it has been incorporated into the Alameda County risk screening protocol for prenatal patients at the first visit. It is anticipated that identification of this problem will enable clinicians to focus additional services on women at the highest risk of low birthweight in this generally high-risk population.

ACKNOWLEDGMENTS

This research supported in part by Contract No. 82-79689, MCH Allotment, Department of Health Services, State of California. The authors wish to acknowledge the assistance of Paul English in programming these data.

REFERENCES

1. Lee KS, Paneth N, Gartner LM, Pearlman MA, Gruss L: Neonatal mortality: an analysis of the recent improvement in the United States. Am J Public Health 1980; 70:15–20.
2. Shapiro S: New reductions in infant mortality: the challenge of low birthweight. Am J Public Health 1981; 71:365–366.
3. Williams RL, Chen PM: Identifying the sources of the recent decline in perinatal mortality rates in California. N Engl J Med 1982; 306:207–214.
4. Chase HC: Time trends in low birthweight in the United States, 1950–1974. *In:* Reed DM, Stanley FJ (eds): The Epidemiology of Prematurity. Baltimore: Urban and Schwartzenberg, 1977.
5. Kleinman JC: Trends and variations in birthweight. *In:* Health, United States, 1981. DHHS Pub. No. (PHS) 82-1232. Washington, DC: Govt Printing Office, 1981.
6. Alameda County Health Care Services Agency: Infant Mortality in the Alameda County Health Jurisdiction 1974–76. Oakland: Management Systems and Analysis, 1979.
7. Cusher IM: Maternal behavior and perinatal risks: alcohol, smoking, and drugs. Ann Rev Public Health 1981; 2:201–218.
8. Eisner V, Brazie JV, Pratt MW, Hexter AC: The risk of low birthweight. Am J Public Health 1979; 69:887–893.
9. Garn SM, Shaw HA, McCabe KD: Effects of socioeconomic status and race on weight-defined and gestational prematurity in the United States. *In:* Reed DM, Stanley FJ (eds): The Epidemiology of Prematurity. Baltimore: Urban and Schwartzenberg, 1977.
10. Gortmaker SL: Poverty and infant mortality in the United States. Am Sociol Rev 1979; 44:280–297.
11. Hardy JB, Mellits ED: Relationship of low birthweight to maternal characteristics of age, parity, education and body size. *In:* Reed DM, Stanley FJ (eds): The Epidemiology of Prematurity. Baltimore: Urban and Schwartzenberg, 1977.
12. Hemminki E, Starfield B: Prevention of low birthweight and pre-term birth: literature review and suggestions for research policy. Milbank Mem Fund Q 1978; 56:339–361.
13. Kaltreider DF, Kohl S: Epidemiology of preterm delivery. Clin Obstet Gynecol 1980; 23:17–31.
14. Placek PJ: Maternal and Infant health factors associated with low infant birth weight: findings from the 1972 National Natality Survey. *In:* Reed DM, Stanley FJ (eds): The Epidemiology of Prematurity. Baltimore: Urban and Schwartzenberg, 1977.
15. Rush D, Davis H, Susser M: Antecedents of low birthweight in Harlem, New York City. Int J Epidemiol 1972; 1:375–387.
16. Stickle G, Ma P: Some social and medical correlates of pregnancy outcome. Am J Obstet Gynecol 1977; 127:162–166.